

FCC Part 15B Measurement and Test Report

For

ATID CO., LTD

#1211 Byuksan/Kyungin Digitalvalley 11, 184, Gasan digital 2-ro,

Geumcheon-gu, Seoul, Korea

FCC ID: VUJAT288N-MA

| | | |
|--------------------------------------|---------------------------------|-------------------|
| Test Rule(s): | <u>FCC Part 15 Subpart B</u> | |
| Product Description: | <u>BlueTooth RFID Reader</u> | |
| Tested Model: | <u>AT288N</u> | |
| Report No.: | <u>STR16118116I-3</u> | |
| Tested Date: | <u>2016-11-14 to 2016-12-22</u> | |
| Issued Date: | <u>2016-12-23</u> | |
| Tested By: | <u>Neil Wong / Engineer</u> | <i>Neil Wong</i> |
| Reviewed By: | <u>Silin Chen / EMC Manager</u> | <i>Silin Chen</i> |
| Approved & Authorized By: | <u>Jandy So / PSQ Manager</u> | <i>Jandy So</i> |
| Prepared By: | | |

Shenzhen SEM.Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C. (518101)
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: ATID CO., LTD
Address of applicant: #1211 Byuksan/Kyungin Digitalvalley 11, 184,
Gasam digital 2-ro, Geumcheon-gu, Seoul, Korea

Manufacturer: ATID CO., LTD
Address of manufacturer: #1211 Byuksan/Kyungin Digitalvalley 11, 184,
Gasam digital 2-ro, Geumcheon-gu, Seoul, Korea

| General Description of EUT | |
|--|-----------------------|
| Product Name: | BlueTooth RFID Reader |
| Trade Name: | Atid |
| Model No.: | AT288N |
| Adding Model(s): | AT288 |
| <i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model AT288N, but the circuit and the electronic construction do not change, declared by the manufacturer.</i> | |

| Technical Characteristics of EUT | |
|----------------------------------|-----------|
| Rated Voltage: | DC 3.7V |
| Rated Current: | 1.5A |
| Rated Power: | $\geq 1W$ |
| Power Adapter Model: | 18.432MHz |
| Highest Internal Frequency: | 26MHz |
| Classification of ITE: | Class B |

1.2 Test Standards

The following report is prepared on behalf of the ATID CO., LTD in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

| Test Mode | Description | Remark |
|-----------|---------------|---------------|
| TM1 | Download mode | Connect to PC |

EUT Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|-------------------|------------|---------------------|------------------------|
| / | / | / | / |

Auxiliary Equipment List and Details

| Description | Manufacturer | Model | Serial Number |
|-------------|--------------|-------|---------------|
| Notebook | Lenovo | E10 | / |

Special Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|-------------------|------------|---------------------|------------------------|
| USB cable | 1.0 | Unshielded | Without Core |

1.6 Measurement Uncertainty

| Measurement uncertainty | | |
|--------------------------------|------------|---------------------|
| Parameter | Conditions | Uncertainty |
| Conducted Emissions | Conducted | $\pm 2.88\text{dB}$ |
| Transmitter Spurious Emissions | Radiated | $\pm 5.1\text{dB}$ |

1.7 Test Equipment List and Details

| No. | Description | Manufacturer | Model | Serial No. | Cal Date | Due Date |
|-----------|-------------------|-----------------|-----------|------------|------------|------------|
| SEMT-1072 | Spectrum Analyzer | Agilent | E4407B | MY41440400 | 2016-06-04 | 2017-06-03 |
| SEMT-1031 | Spectrum Analyzer | Rohde & Schwarz | FSP30 | 836079/035 | 2016-06-04 | 2017-06-03 |
| SEMT-1007 | EMI Test Receiver | Rohde & Schwarz | ESVB | 825471/005 | 2016-06-04 | 2017-06-03 |
| SEMT-1008 | Amplifier | Agilent | 8447F | 3113A06717 | 2016-06-04 | 2017-06-03 |
| SEMT-1043 | Amplifier | C&D | PAP-1G18 | 2002 | 2016-06-04 | 2017-06-03 |
| SEMT-1011 | Broadband Antenna | Schwarz beck | VULB9163 | 9163-333 | 2016-06-04 | 2017-06-03 |
| SEMT-1042 | Horn Antenna | ETS | 3117 | 00086197 | 2016-06-04 | 2017-06-03 |
| SEMT-1069 | Loop Antenna | Schwarz beck | FMZB 1516 | 9773 | 2016-06-04 | 2017-06-03 |
| SEMT-1001 | EMI Test Receiver | Rohde & Schwarz | ESPI | 101611 | 2016-06-04 | 2017-06-03 |
| SEMT-1003 | L.I.S.N | Schwarz beck | NSLK8126 | 8126-224 | 2016-06-04 | 2017-06-03 |
| SEMT-1002 | Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100911 | 2016-06-04 | 2017-06-03 |

2. SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test Item | Result |
|------------------|---------------------------------|---------------|
| § 15.107 (a) | Conducted Emissions | Compliant |
| § 15.109 (a) | Radiated Emissions | Compliant |

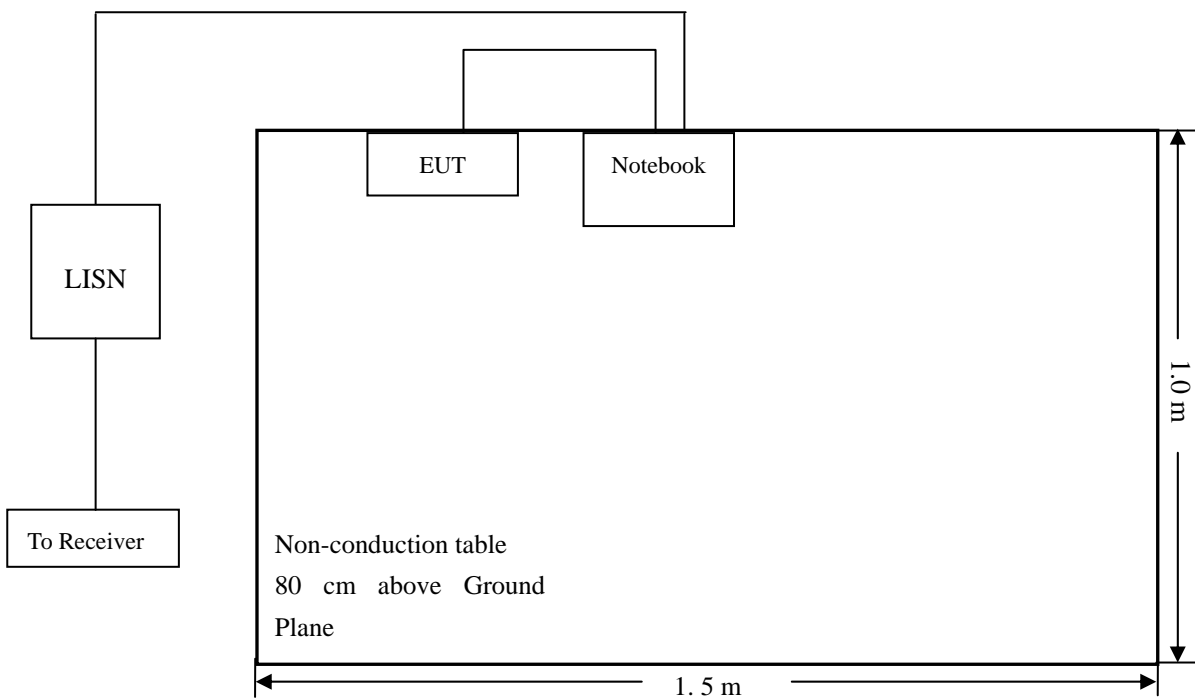
N/A: not applicable

3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.2 Basic Test Setup Block Diagram



3.3 Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 23 °C |
| Relative Humidity: | 52% |
| ATM Pressure: | 1011 mbar |

3.4 Summary of Test Results/Plots

According to the data in section 3.6, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

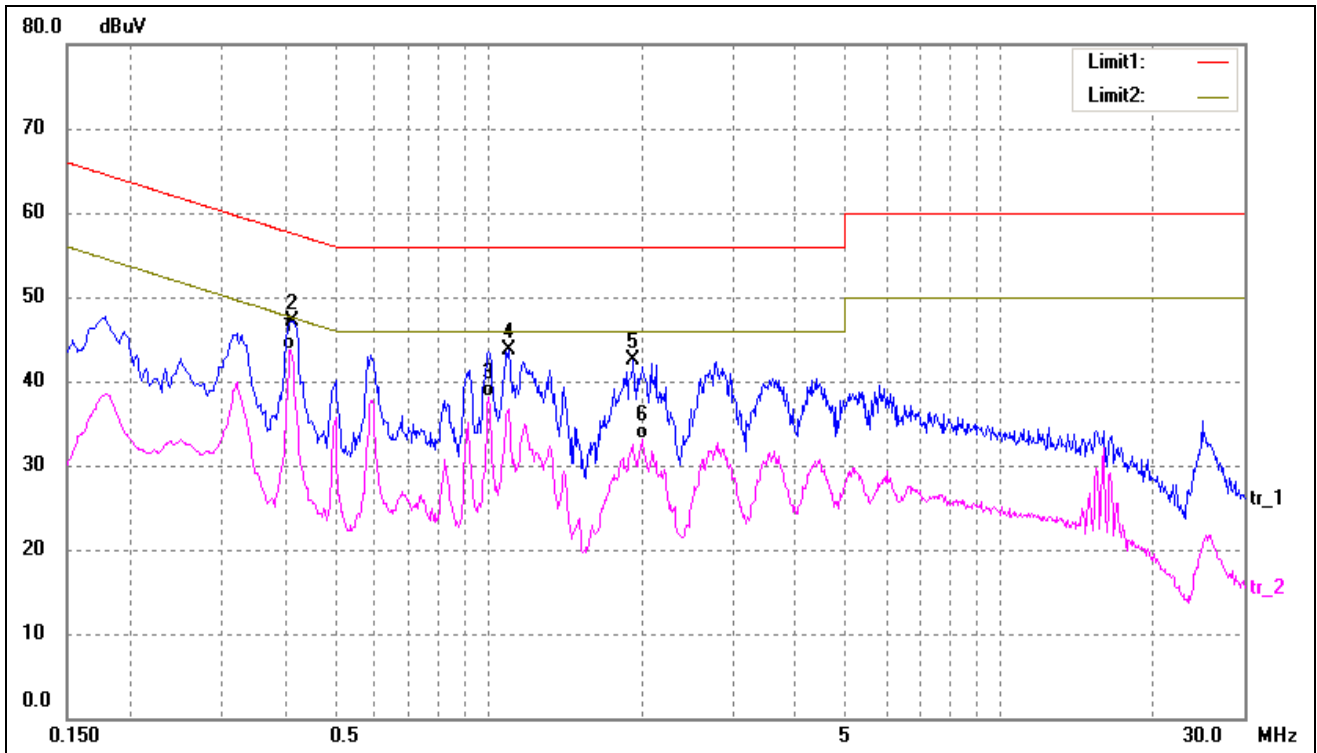
-3.86 dB at 0.4100 MHz in the **Neutral, AVG** detector, 0.15-30MHz

3.5 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

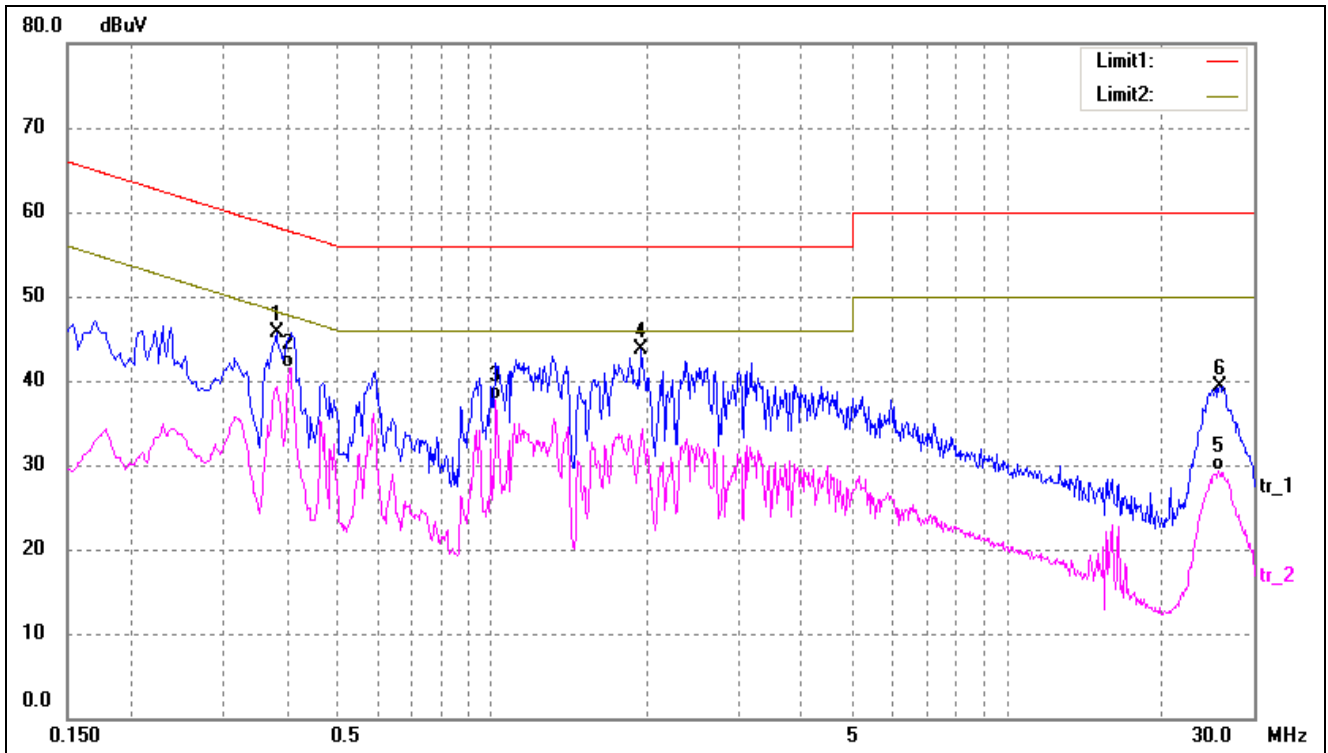
EUT: *BlueTooth RFID Reader*
 Tested Model: *AT288N*
 Operating Condition: *TM1*
 Comment: *AC 120V/60Hz; USB 5V*

Test Specification: *Neutral*



| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|----------------|---------------|--------------|-------------|----------|
| 1* | 0.4100 | 34.29 | 9.50 | 43.79 | 47.65 | -3.86 | AVG |
| 2 | 0.4140 | 37.60 | 9.50 | 47.10 | 57.57 | -10.47 | peak |
| 3 | 1.0020 | 28.12 | 10.00 | 38.12 | 46.00 | -7.88 | AVG |
| 4 | 1.0940 | 33.62 | 10.00 | 43.62 | 56.00 | -12.38 | peak |
| 5 | 1.9260 | 32.46 | 10.00 | 42.46 | 56.00 | -13.54 | peak |
| 6 | 1.9980 | 23.02 | 10.00 | 33.02 | 46.00 | -12.98 | AVG |

Test Specification: Line



| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|----------------|---------------|--------------|-------------|----------|
| 1 | 0.3820 | 36.18 | 9.50 | 45.68 | 58.24 | -12.56 | peak |
| 2* | 0.4060 | 32.00 | 9.50 | 41.50 | 47.73 | -6.23 | AVG |
| 3 | 1.0180 | 27.66 | 10.00 | 37.66 | 46.00 | -8.34 | AVG |
| 4 | 1.9460 | 33.75 | 10.00 | 43.75 | 56.00 | -12.25 | peak |
| 5 | 25.6340 | 16.37 | 13.00 | 29.37 | 50.00 | -20.63 | AVG |
| 6 | 25.7500 | 26.37 | 13.00 | 39.37 | 60.00 | -20.63 | peak |

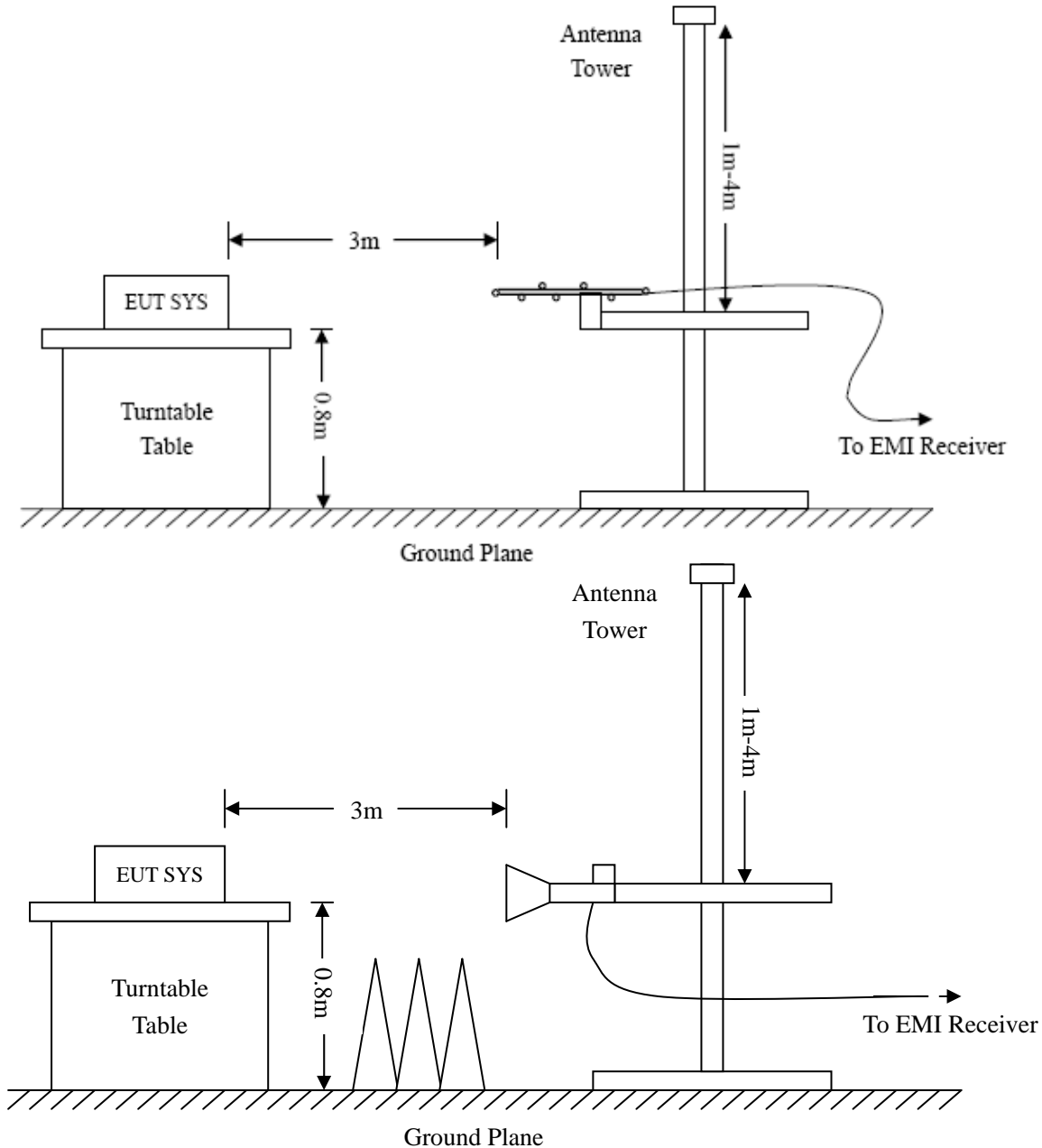
4. Radiated Emissions

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.2 Test Receiver Setup

| | | |
|--------------------------|------------------------------|------------------------------|
| Frequency :9kHz-30MHz | Frequency :30MHz-1GHz | Frequency :Above 1GHz |
| RBW=10KHz, | RBW=120KHz, | RBW=1MHz, |
| VBW =30KHz | VBW=300KHz | VBW=3MHz(Peak), 10Hz(AV) |
| Sweep time= Auto | Sweep time= Auto | Sweep time= Auto |
| Trace = max hold | Trace = max hold | Trace = max hold |
| Detector function = peak | Detector function = peak, QP | Detector function = peak, AV |

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.4 Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 23 °C |
| Relative Humidity: | 55 % |
| ATM Pressure: | 1011 mbar |

4.5 Summary of Test Results/Plots

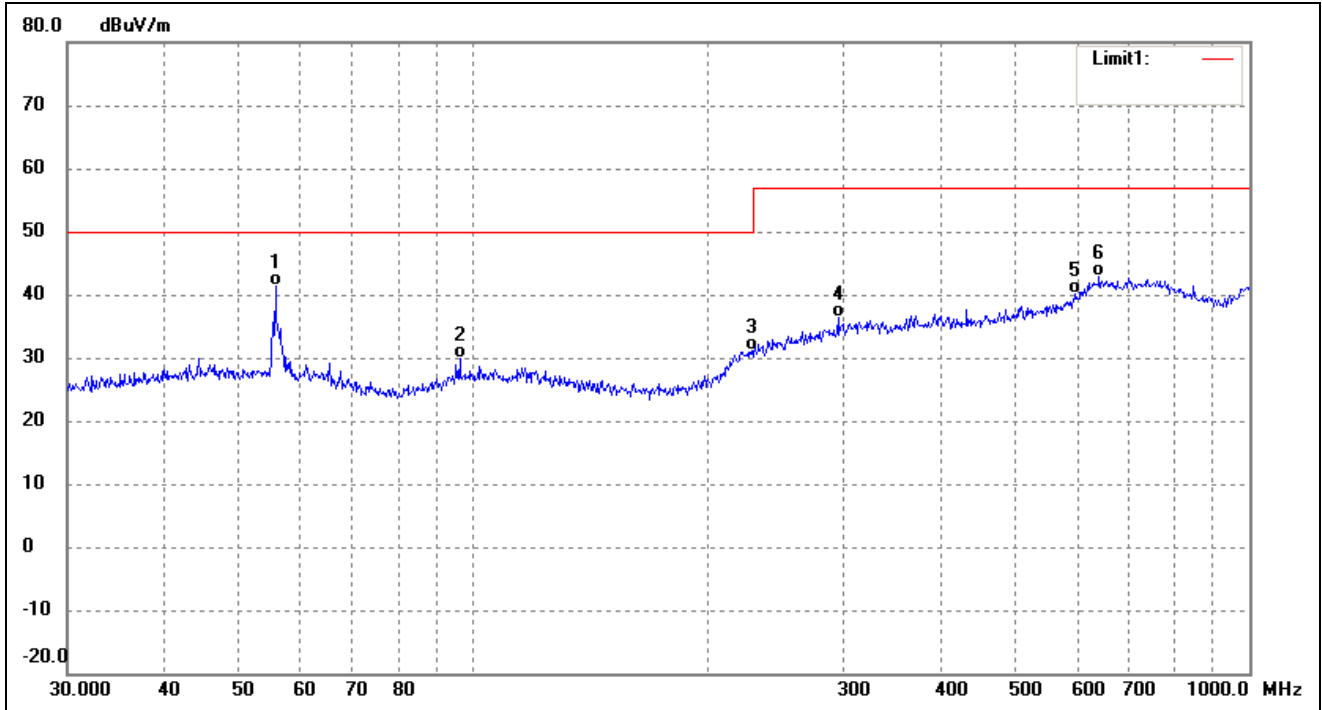
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-8.69 dB at 55.6094 MHz in the Horizontal polarization, 9 kHz to 12.75 GHz, 3Meters

Plot of Radiated Emissions Test Data

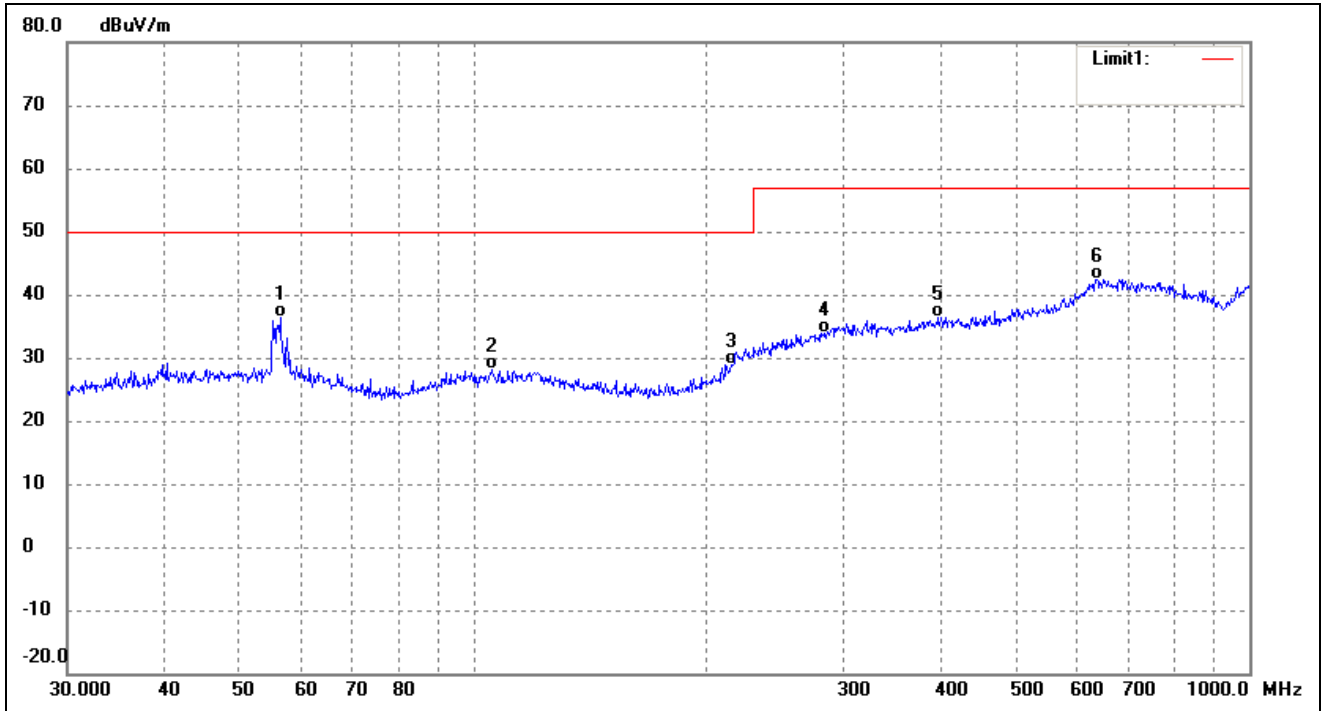
EUT: *BlueTooth RFID Reader*
 Tested Model: *AT288N*
 Operating Condition: *TM1*
 Comment: *AC 120V/60Hz; USB 5V*

Test Specification: *Horizontal*



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree () | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1 | 55.6094 | 36.29 | 5.02 | 41.31 | 50.00 | -8.69 | 134 | 100 | QP |
| 2 | 96.0986 | 25.43 | 4.34 | 29.77 | 50.00 | -20.23 | 98 | 100 | QP |
| 3 | 228.4904 | 22.98 | 8.20 | 31.18 | 50.00 | -18.82 | 209 | 100 | QP |
| 4 | 295.1469 | 24.55 | 11.78 | 36.33 | 57.00 | -20.67 | 99 | 100 | QP |
| 5 | 597.2234 | 21.80 | 18.24 | 40.04 | 57.00 | -16.96 | 279 | 100 | QP |
| 6 | 640.6110 | 24.88 | 18.05 | 42.93 | 57.00 | -14.07 | 321 | 100 | QP |

Test Specification: Vertical



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree () | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1 | 56.3948 | 31.38 | 5.00 | 36.38 | 50.00 | -13.62 | 199 | 100 | QP |
| 2 | 105.6415 | 23.18 | 4.88 | 28.06 | 50.00 | -21.94 | 258 | 100 | QP |
| 3 | 215.2678 | 22.33 | 6.65 | 28.98 | 50.00 | -21.02 | 70 | 100 | QP |
| 4 | 283.9791 | 22.56 | 11.30 | 33.86 | 57.00 | -23.14 | 90 | 100 | QP |
| 5 | 397.6334 | 23.84 | 12.58 | 36.42 | 57.00 | -20.58 | 249 | 100 | QP |
| 6 | 636.1340 | 24.57 | 17.93 | 42.50 | 57.00 | -14.50 | 172 | 100 | QP |

Note: Testing is carried out with frequency rang 9 kHz to the 12.75GHz, The measurements greater than 20dB below the limit from 9kHz to 30MHz and above 1GHz.

***** END OF REPORT *****